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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJI XEROX CO LTD

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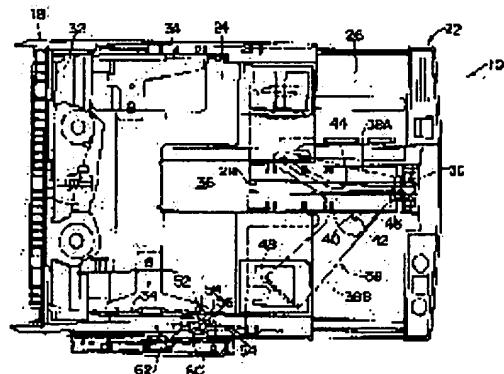
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OZAWA TORU

(54) PAPER FEEDING CASSETTE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a paper feeding cassette storing paper sheets of multiple sizes in a small space and capable of detecting the size of the stored paper sheets.

SOLUTION: When an auxiliary container 22 is inserted into a main container 18, a paper rear end guide 30 can be slid to change the length of a storage section 36. When the paper rear end guide 30 is slid, a small spur gear body 54 is rotated by the prescribed angle via a large spur gear body 38 to thrust a size detecting plate spring 60, a microswitch 62 is turned on or off, and the position of the paper rear end guide 30 is detected. When the auxiliary container 22 is extracted, the paper rear end guide 30 is slid integrally with the auxiliary container 22, and the storage section 36 becomes long. The size detecting plate spring 60 is thrust by the size detecting rib of the auxiliary container 22, the microswitch 62 is turned on or off, and the position of the auxiliary container 22 is detected. The auxiliary container 22 may be extracted from the main container 18 by the required quantity for space saving.



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CLAIMS

[Claim(s)]

[Claim 1] The 1st bottle object with which feed equipment is equipped, and the 2nd bottle object which expands and contracts by equipping said 1st bottle object possible [a slide], and sliding the hold section which can hold a form, The guide plate which is attached possible [the slide to said 2nd bottle object], and expands and contracts said hold section by slide actuation, The sheet paper cassette characterized by having a guide plate detection means to detect the slide position to said 1st bottle object of said guide plate, and a 2nd bottle object detection means to detect the slide position to said 1st bottle object of said 2nd bottle object.

[Claim 2] The sheet paper cassette according to claim 1 characterized by having the rib which said guide plate detection means has the gear train rotated with the slide of said guide plate, and the cam which contacts the switch with which it was prepared in said feed equipment corresponding to angle of rotation of said gear train, and said 2nd bottle object detection means is formed in said 2nd bottle object, and contacts said switch corresponding to the slide position of the 2nd bottle object.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] About a sheet paper cassette, in more detail, this invention holds two or more forms, and relates to the sheet paper cassette with which the feed equipment which supplies a form to image formation equipment etc. is equipped.

[0002]

[Description of the Prior Art] By the cassette 110 (refer to JP,59-212332,A) shown in drawing 8, after the interior of this cassette 110 in which the top face carried out opening, and two dashboards 116 and 118 have crossed at right angles, it is arranged by the finger movable. Dashboards 116 and 118 are moved according to the size of a form, and the location of the form held in a cassette 110 between these dashboards 116 and 118, the front plate 112 of a cassette 110, and a side plate 114 is decided. Moreover, with the magnetic sensor arranged on the top face of the bottom plate 120 of a cassette 110, the location of dashboards 116 and 118 is detected and the size of the form held in the cassette 110 is detected.

[0003] However, by the above-mentioned cassette 110, the size of a form is supported only by moving the dashboards 116 and 118 inside a cassette 110, and the magnitude of a cassette 110 is formed according to the form of the maximum size. Therefore, according to the size of a form, magnitude of cassette 110 the very thing cannot be made small, but futility arises to a tooth space.

[0004] Moreover, in the form cassette unit 130 (refer to JP,8-119462,A) shown in drawing 9 and drawing 10, the tail guide 134 and the guide 136 are attached in the direction which intersected perpendicularly, respectively movable in the form cassette 132. Each location is detected because the tail guide 134 makes a switch turn on and off through a link 138 and a drum 140 and a guide 136 makes a switch turn on and off through a lever 142 and a slider 144 similarly.

[0005] However, also with this form cassette unit 130, the magnitude of the form cassette 132 is formed according to the form of the maximum size, and futility produces it to a tooth space.

[0006] Moreover, the form back end guide 152 is divided and constituted from a cassette 150 of the image recording equipment shown in drawing 11 and drawing 12 in two guide members 154 and 156, and corresponding to the slide position of one guide member 154, the guide member 154 and really fabricated rib operates the cam 158 for size detection in a specific combination, and turns a switch on and off. The size of a form is detectable with this.

[0007] Moreover, by this cassette 150, even if the magnitude of cassette 150 the very thing is changeable, the size of a form is undetectable, although the guide member 156 of another side can also be made to slide according to a paper size now with the guide member 156.

[0008] Furthermore, by this cassette 150, the paper size is detected only with the slide position of the guide member 154, and moreover, since the rib which turns on and off the cam 158 for size detection is the guide member 154 and really fabricated, a limitation is generated in the amount of slides of the guide member 154. For example, when it pushes in most when pulling out the guide member 154 most (when it is made to move toward the drawing 11 left-hand side), a ratio becomes about 1.38 times (when it is made to move toward the drawing 11 right-hand side). Therefore, the form of the size beyond this limitation will not be able to be held in a cassette 150, but it will be necessary to form a cassette separately corresponding to the form of various sizes.

[0009]

[Problem(s) to be Solved by the Invention] Let it be a technical problem for this invention to obtain the sheet

paper cassette which can detect the size of the form held while being a small tooth space and holding the form of two or more sizes in consideration of this fact.

[0010]

[Means for Solving the Problem] The 1st bottle object with which feed equipment is equipped in invention according to claim 1, and the 2nd bottle object which expands and contracts by equipping said 1st bottle object possible [a slide], and sliding the hold section which can hold a form, The guide plate which is attached possible [the slide to said 2nd bottle object], and expands and contracts said hold section by slide actuation, It is characterized by having a guide plate detection means to detect the slide position to said 1st bottle object of said guide plate, and a 2nd bottle object detection means to detect the slide position to said 1st bottle object of said 2nd bottle object.

[0011] It is in the condition which pushed in the 2nd bottle object most to the 1st bottle object, and by making a guide plate slide further, the hold section can be made to be able to expand and contract and the form of two or more sizes can be held. When a guide plate detection means detects the location of a guide plate, the size of the form held in the hold section is detected. Moreover, since the 2nd bottle object is most pushed in to the 1st bottle object, it becomes small as the whole sheet paper cassette, and it becomes space-saving also when feed equipment is equipped.

[0012] By making the 2nd bottle object slide and pulling out from the 1st bottle object, the hold section can be extended further and the form of big size can be held. In this condition, when the 2nd bottle object detection means detects the location of the 2nd bottle object, the size of the form held in the hold section is detected. Moreover, since it is not necessary to pull out the 2nd bottle object more than the size of the form held, it becomes necessary minimum magnitude as the whole sheet paper cassette, and it becomes space-saving also when feed equipment is equipped.

[0013] In invention according to claim 2, it is characterized by to have the rib which said guide plate detection means has the gear train rotated with the slide of said guide plate, and the cam which contacts the switch with which it was prepared in said feed equipment corresponding to angle of rotation of said gear train, and said 2nd bottle object detection means is formed in said 2nd bottle object, and contacts said switch corresponding to the slide position of the 2nd bottle object in invention according to claim 1.

[0014] Therefore, if a guide plate slides, the gear train will rotate and a cam will contact a switch corresponding to this angle of rotation. Moreover, a slide of the 2nd bottle object contacts a rib on a switch corresponding to this slide position. Thus, the same switch in which the guide plate detection means and the 2nd bottle object detection means were formed by feed equipment can be made to contact with easy structure.

[0015]

[Embodiment of the Invention] The outline configuration of the image recording equipment 14 which has feed equipment 12 with which drawing 1 - drawing 3 were equipped with the sheet paper cassette 10 concerning the gestalt of 1 operation of this invention is shown. Moreover, this sheet paper cassette 10 is shown in drawing 4 - drawing 7. It is discharged, after the form taken out one sheet at a time from the sheet paper cassette 10 is conveyed by the body 16 of image recording equipment 14 and an image is recorded within a body 16 by feed equipment 12.

[0016] As shown in drawing 4 - drawing 6, the sheet paper cassette 10 has the main container 18 with which feed equipment 12 is equipped. The main container 18 is formed in box-like [of an abbreviation rectangular parallelepiped / flat], and the top face and the rear face (field on the right-hand side of drawing 4 - drawing 7) are opened wide. Moreover, width of face (drawing 4 and the drawing 6 space vertical lay length) of the main container 18 is enlarged a little rather than the maximum width of this form in consideration of the maximum width of the form held in a sheet paper cassette 10.

[0017] As shown in drawing 1 and drawing 2, feed equipment 12 is equipped with a sheet paper cassette 10 by this main container 18 being inserted and held at the opening 20 formed in feed equipment 12 from a front-face side (drawing 1 and drawing 2 left-hand side). In addition, in drawing 3, the condition in the middle of inserting a sheet paper cassette 10 in opening 20 is shown, and the sheet paper cassette 10 is greatly projected from feed equipment 12 rather than the wearing condition shown in drawing 2.

[0018] As shown in drawing 4 - drawing 6, the main container 18 is equipped with the subcontainer 22. The subcontainer 22 is formed in box-like [of an abbreviation rectangular parallelepiped / flat], and the top face and the front face (field drawing 4 R> 4 - on the left-hand side of drawing 7) are opened wide. Moreover, width

of face (drawing 4 and the drawing 6 space vertical lay length) of the subcontainer 22 is made shorter than the width of face of the main container 18. The subcontainer 22 is inserted from the rear-face side of the main container 18 by this. In the state of insertion, the main container 18 and the subcontainer 22 are united, and a sheet paper cassette 10 is constituted.

[0019] Moreover, the long hole is formed in the inferior surface of tongue of the bottom plate 26 (refer to drawing 6) of the subcontainer 22 along the path of insertion (drawing 4 R> 4 - drawing 7 longitudinal direction) to the main container 18 of the subcontainer 22, and the projection which protruded on this long hole from the top face of the bottom plate 24 of the main container 18 and which is not illustrated is held in it. Thereby, to the main container 18, there is no subcontainer 22 with backlash ***** , and it is slid.

[0020] Furthermore, two or more engagement sections which are not illustrated are formed in the predetermined location of this long hole, and moderate resistance arises at the time of the slide to the main container 18 of the subcontainer 22 because the projection of the bottom plate 24 of the main container 18 engages with this engagement section. That is, this engagement section acts as a stopper device in which the subcontainer 22 is positioned by the position to the main container 18.

[0021] The slide slot 28 is formed in the center of the cross direction at the subcontainer 22 along the path of insertion (drawing 4 - drawing 7 longitudinal direction) and this direction of the main container 18. The lower part of the form back end guide 30 is held in the slide slot 28.

[0022] The form back end guide 30 is formed in tabular [of an abbreviation rectangle], and its direction of a normal of the corresponds with the slide direction of the subcontainer 22. The hold section 36 which can hold the form of predetermined size consists of this form back end guide 30, and the dark room 32 and the width-of-face guide 34 of the main container 18. In addition, this width-of-face guide 34 contacts the side side of two or more forms held in the hold section 36 in the state of the laminating, and carries out location **** of the form of these plurality crosswise. Moreover, the width-of-face guide 34 moves crosswise [of a form] according to the guidance device which is not illustrated.

[0023] From the lower part of the form back end guide 30, the projection 46 protrudes and this projection 46 is held in the long hole which was formed in the slide slot 28 and which is not illustrated. Thereby, the form back end guide 30 is slid along the slide slot 28, while the direction of a normal maintains the condition of having been in agreement with the slide direction of the subcontainer 22. The die length of the hold section 36 can be changed by making the form back end guide 30 slide. Moreover, the form back end guide 30 will be attached in the main container 18 possible [a slide] through the subcontainer 22 by this.

[0024] The Ohira gearing object 38 formed in the inferior surface of tongue of the bottom plate 26 of the subcontainer 22 in the shape of abbreviation for L characters is arranged. A pin 40 protrudes in the center of abbreviation of the Ohira gearing object 38 toward the bottom plate 26 of the subcontainer 22, and it is inserted in the support hole 42 further formed in the inferior surface of tongue of a bottom plate 26 at balking needlessness. By this, the Ohira gearing object 38 is supported by the bottom plate 26 of the subcontainer 22 pivotable considering the pin 40 as a core.

[0025] The cut groove 44 is formed in short side part 38A of the Ohira gearing object 38 along with the longitudinal direction of this short side part 38A, and the projection 46 which protruded on this cut groove 44 from the lower limit of the form back end guide 30 is held in it. When the form back end guide 30 is made to slide, the configuration of a cut groove 44 is made into the predetermined cam configuration so that it may be pushed on projection 46 in a specific location and the Ohira gearing object 38 may rotate only a predetermined include angle.

[0026] Moreover, the gear gear tooth 48 is formed at the tip of long side 38B of the Ohira gearing object 38, and the Ohira gearing object 38 constitutes the Ohira gearing centering on a pin 40 substantially.

[0027] The idler spur gear 52 and the Kodaira gearing object 54 are that it is pivotable and always supported to revolve with the engagement condition by the side attachment wall 50 of the main container 18. Moreover, the idler spur gear 52 is supported to revolve with the position so that the subcontainer 22 may be in the condition (refer to drawing 4 and drawing 5) pushed to the very back to the main container 18 and may gear with the gear gear tooth 48 of the Ohira gearing object 38. Therefore, if the Ohira gearing object 38 rotates in this condition, this rotation will be transmitted to the Kodaira gearing object 54 through the idler spur gear 52, and the Kodaira gearing object 54 will rotate.

[0028] the Kodaira gearing object 54 comes out with the size detection cam 58 of the Kodaira gearing 56

formed [with which / in the perimeter], this Kodaira gearing 56, and really formed predetermined configuration, and is constituted. Moreover, the Kodaira gearing object 54 is in the condition that the sheet paper cassette 10 was pushed from the opening 20 of feed equipment 12 to the very back, and it is attached in the position so that the size detection cam 58 may counter with two or more size detection flat spring 60 prepared in feed equipment 12. And if the Kodaira gearing object 54 rotates, in order that the cam side of the size detection cam 58 may carry out field contact among two or more size detection flat spring 60 at the size detection flat spring 60 of specification (1 or plurality) according to the angle of rotation, the size detection flat spring 60 is resisted and stuffed into the elastic force of flat spring. Thus, the microswitch 62 formed in feed equipment 12 is turned on and off by the combination and the amount of pushing of the size detection flat spring 60 which were pushed in.

[0029] Therefore, where a sheet paper cassette 10 is stuffed into the opening 20 of feed equipment 12 to the very back, if the form back end guide 30 is made to slide, the Ohira gearing object 38 carries out predetermined include-angle rotation, this will be interlocked with and the Kodaira gearing object 54 will also carry out predetermined include-angle rotation. And the size detection flat spring 60 of specification (1 or plurality) is pushed in, the location of the form back end guide 30 is detected, and the size of the form held in the hold section 36 is detected as a result. A microswitch 62 transmits the positional information of the form back end guide 30 to the body 16 of image recording equipment 14.

[0030] In addition, where a sheet paper cassette 10 is pulled out from the opening 20 of feed equipment 12, in order that the gear gear tooth 48 of the Ohira gearing object 38 may separate from the gear gear tooth of the Kodaira gearing object 54, the size detection flat spring 60 is not pushed in and a microswitch 62 is not turned on, either.

[0031] Moreover, predetermined spacing is opened in the slide direction (drawing 4 - drawing 7 longitudinal direction) of the subcontainer 22, and the rib 66 for size detection of plurality (the gestalt of this operation three pieces) is formed in the external surface of the side attachment wall 64 of the subcontainer 22. When the subcontainer 22 is made to slide from the main container 18 and is pulled out, the location of these ribs 66 for size detection is a predetermined drawer location, and it is set up so that it may become the location which pushes in the size detection flat spring 60 of specification (1 or plurality) among two or more size detection flat spring 60 prepared in feed equipment 12. Thus, the microswitch 62 formed in feed equipment 12 is turned on and off by the combination and the amount of pushing of the size detection flat spring 60 which were pushed in, the location of the subcontainer 22 is detected, and the size of the form held in the hold section 36 is detected as a result. A microswitch 62 transmits this information to the body 16 of image recording equipment 14.

[0032] In addition, the combination of the size detection flat spring 60 pushed in by doing in this way is set up so that it may become the combination of the size detection flat spring 60 pushed in when the form back end guide 30 is made to slide where the subcontainer 22 is most pushed in to the main container 18, and a different combination, and confusion produces it.

[0033] Next, an operation of the sheet paper cassette 10 concerning the gestalt of this operation is explained. As shown in drawing 4 and drawing 5 , where the subcontainer 22 is pushed in to the very back to the main container 18, the hold section 36 is constituted by the form back end guide 30, and the dark room 32 and the width-of-face guide 34 of the main container 18. One sheet or two or more sheets of forms by which the laminating was carried out can be held in this hold section 36.

[0034] By making the form back end guide 30 slide, the die length (the die length of the drawing 4 longitudinal direction) of the hold section 36 can be changed. Thereby, since it expands and contracts the hold section 36, corresponding to the form of various sizes, these forms can be held in the hold section 36.

[0035] If the form back end guide 30 is made to slide, the projection 46 of the form back end guide 30 will move in the inside of a cut groove 44. If the amount of slides of the form back end guide 30 reaches a predetermined value, since the cut groove 44 made into the predetermined cam configuration will be pushed on projection 46, the Ohira gearing object 38 carries out predetermined include-angle rotation. Since the microswitch 62 with which predetermined include-angle rotation was carried out, the size detection flat spring 60 of specification (1 or plurality) was pushed in by the cam side of the size detection cam 58, and the Kodaira gearing object 54 was also formed in feed equipment 12 by this is turned on and off, the location of the form back end guide 30 is detected. Consequently, the die length of the form held in the hold section 36 is detected.

[0036] The subcontainer 22 is pushed to the very back to the main container 18, and the die length of a sheet

paper cassette 10 is short. Thereby, as shown in drawing 1, it is stopped to the minimum, and since [of a sheet paper cassette 10] the whole is mostly held in image recording equipment 14, the amount of protrusions of the sheet paper cassette 10 from image recording equipment 14 serves as space-saving. It becomes possible to also make a sheet paper cassette 10 hold completely in image recording equipment 14 depending on relative relation with image recording equipment 14.

[0037] Where it moved the form back end guide 30 to the location nearest to the backplate 68 of the subcontainer 22 and the hold section 36 is extended, in order to hold a form with bigger size than this hold section 36, the subcontainer 22 is pulled out from the main container 18. Thereby, the form back end guide 30 is also slid by the subcontainer 22 and one, and the die length of the hold section 36 becomes long.

[0038] Since the gear gear tooth 48 of the Ohira gearing object 38 separates from the idler spur gear 52 at this time, the Kodaira gearing object 54 does not rotate. For this reason, the size detection flat spring 60 is not pushed in and a microswitch 62 is not turned on, either.

[0039] If the subcontainer 22 is pulled out to a predetermined location, since the projection which protruded from the bottom plate 24 of the main container 18 and which is not illustrated will engage with the engagement section of the long hole which was formed in the subcontainer 22 and which is not illustrated, moderate resistance arises in the cash drawer of the subcontainer 22, and the subcontainer 22 is positioned by the position.

[0040] At this time, the specific rib 66 for size detection of two or more ribs 66 for size detection formed in the predetermined location of the external surface of the side attachment wall 64 of the subcontainer 22 pushes in the size detection flat spring 60 of specification (1 or plurality). Thereby, since a microswitch 62 is turned on and off, the location of the subcontainer 22 is detected. Consequently, the size of the form held in the hold section 36 is detected.

[0041] At this time, if only a complement is pulled out from the main container 18 corresponding to the die length of a form, it is sufficient for the subcontainer 22, and it can make the die length of the sheet paper cassette 10 whole necessary minimum die length. For this reason, as shown in drawing 2, the protrusion length of the sheet paper cassette 10 from image recording equipment 14 can be made into the minimum, and it becomes space-saving.

[0042] If the subcontainer 22 is furthermore pulled out from the main container 18, a form with more long die length can be held. Also at this time, if the subcontainer 22 is pulled out to a predetermined location, the projection which protruded from the bottom plate 24 of the main container 18 and which is not illustrated will engage with the engagement section of the long hole which was formed in the subcontainer 22 and which is not illustrated, and the subcontainer 22 will be positioned in this predetermined location. Here, since the specific rib 66 for size detection of two or more ribs 66 for size detection formed in the side attachment wall 64 of the subcontainer 22 pushes in the size detection flat spring 60 of specification (1 or plurality) and the slide position of the subcontainer 22 is detected, the size of the form held in the hold section 36 is detected as a result.

[0043] Thus, also when the form back end guide 30 is made to slide and the subcontainer 22 is made to slide, it is not necessary to make the same microswitch 62 turn on and off, to detect the size of a form, and to form two or more microswitches 62.

[0044] Moreover, since the slide slot 28 is formed in the center of the cross direction of the subcontainer 22, the form back end guide 30 is also located in the center of the cross direction of a sheet paper cassette 10. Thereby, location **** of the form can be carried out to the crosswise center line of a sheet paper cassette 10 as the so-called pin center, large register method at contrast. Of course, in relation with the width of face of a form, it can also consider as the so-called side register method.

[0045] Although the slide length of the form back end guide 30 and the drawer length of the subcontainer 22 can set up suitably according to the die length of the form held in a sheet paper cassette 10 As described above, the ratio of the die length when lengthening the hold section 36 most and the die length when shortening most can be made into 3 or more times by enabling both slides of the form back end guide 30 and the subcontainer 22. For example, the ratio which described above the die length when making die length when lengthening the hold section 36 most into the die length (431.8mm) of the long side of leisure 17", and shortening it most as die length (139.7mm) of the shorter side of a statement can be made into about 3.09 times.

[0046] In addition, about the configuration which presupposes that it is the form back end guide 30 as carrying out slide possible [of the subcontainer 22] to the main container 18 **** [and] to the main container 18, it is

not restricted to the above-mentioned configuration. [making SURAITO possible] What is necessary is in short, to change the die length of the hold section 36 and just to be able to expand and contract the hold section 36, when the form back end guide 30 slides to the main container 18. What is necessary is similarly, to change the die length of the hold section 36 and just to be able to expand and contract the hold section 36, when the subcontainer 22 makes a slide possible to the main container 18.

[0047] As described above also as a back end guide detection means as a guide plate detection means, as long as it is not necessary to consist of an Ohira gearing object 38, an idler spur gear 52, and a Kodaira gearing object 54 and can detect the slide position of the form back end guide 30, what kind of configuration may be used. For example, the rack is attached in the form back end guide 30, and migration of this rack is changed into rotation through the gear train, it transmits to the Kodaira gearing object 54, and you may make it rotate the Kodaira gearing object 54.

[0048] As long as similarly it is not restricted to the rib 66 for size detection described above also as a subbottle object detection means as a 2nd bottle object detection means but can detect the location of the subcontainer 22, what kind of configuration may be used.

[0049]

[Effect of the Invention] The 1st bottle object with which feed equipment is equipped in invention according to claim 1, and the 2nd bottle object which expands and contracts by equipping said 1st bottle object possible [a slide], and sliding the hold section which can hold a form, The guide plate which is attached possible [the slide to said 2nd bottle object], and expands and contracts said hold section by slide actuation, Since it has a guide plate detection means to detect the slide position to said 1st bottle object of said guide plate, and a 2nd bottle object detection means to detect the slide position to said 1st bottle object of said 2nd bottle object The size of the form held in the small tooth space while holding the form of two or more sizes is detectable.

[0050] The gear train which said guide plate detection means rotates with the slide of said guide plate in invention according to claim 1 in invention according to claim 2, The cam which contacts the switch formed in said feed equipment corresponding to angle of rotation of said gear train, Since it has the rib which it *****, and said 2nd bottle object detection means is formed in said 2nd bottle object, and contacts said switch corresponding to the slide position of the 2nd bottle object The same switch in which the guide plate detection means and the 2nd bottle object detection means were formed by feed equipment can be made to contact with easy structure.

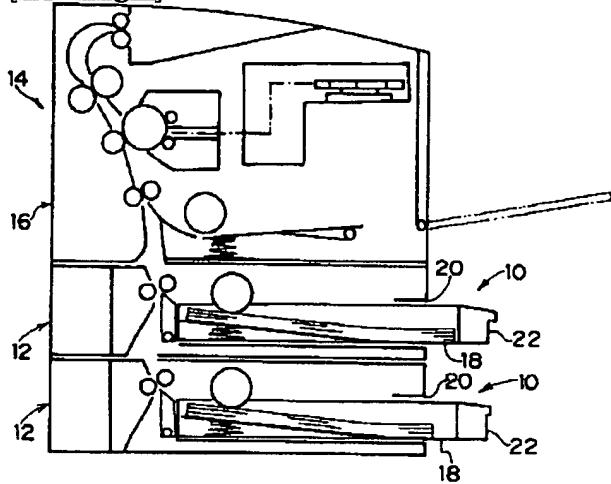
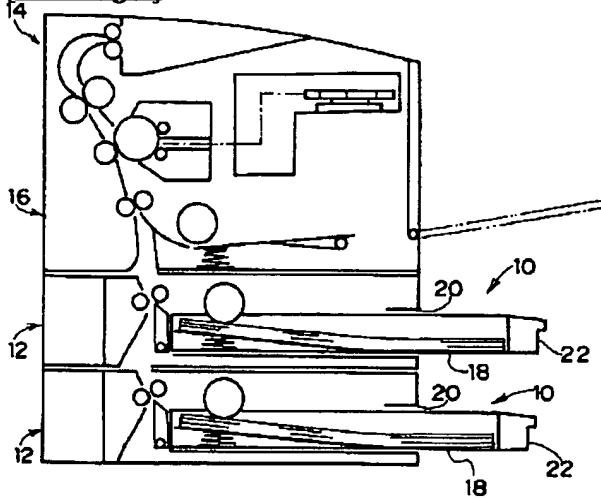
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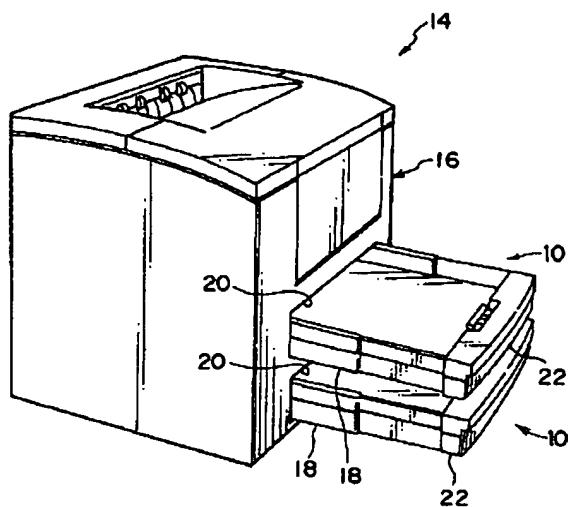
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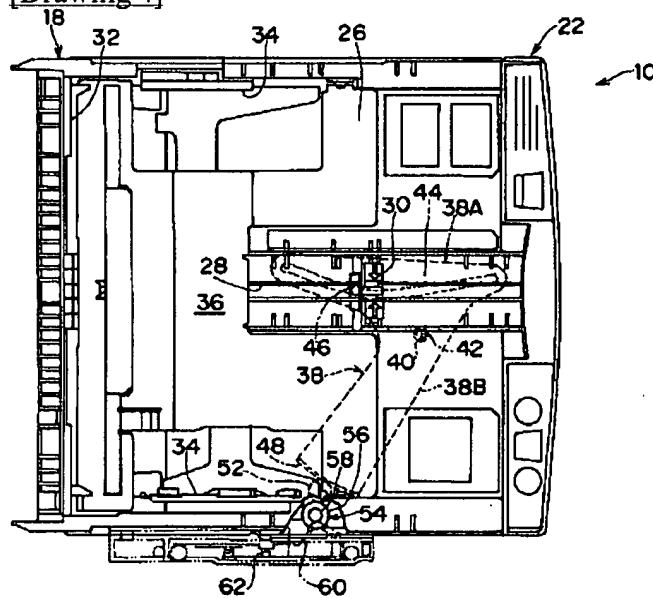
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DRAWINGS

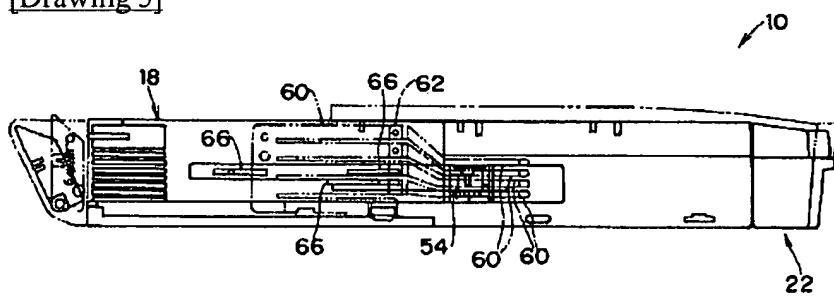
[Drawing 1]**[Drawing 2]****[Drawing 3]**



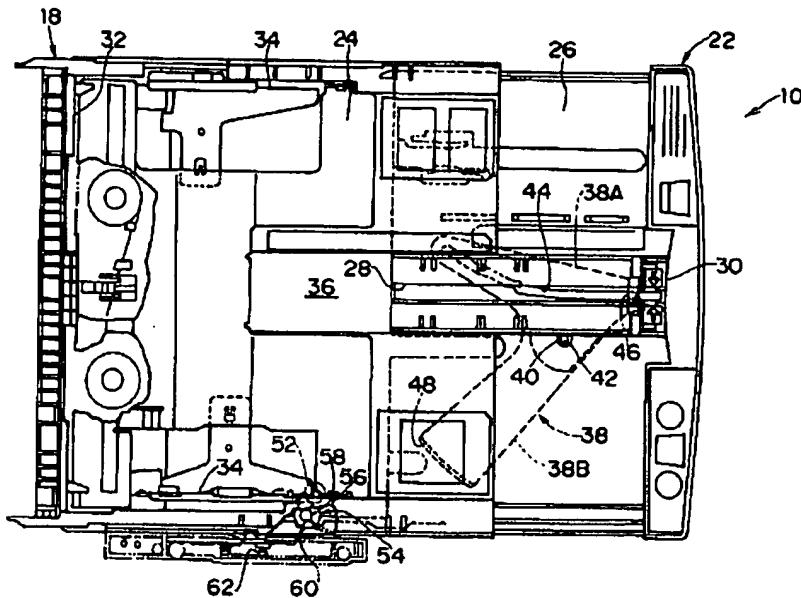
[Drawing 4]



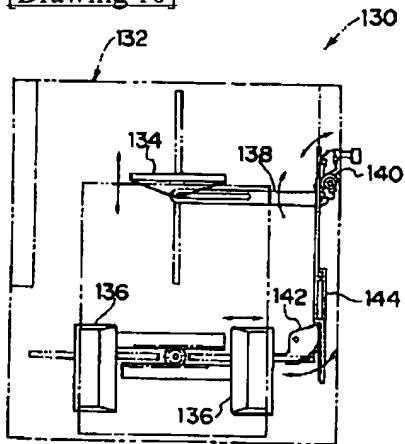
[Drawing 5]



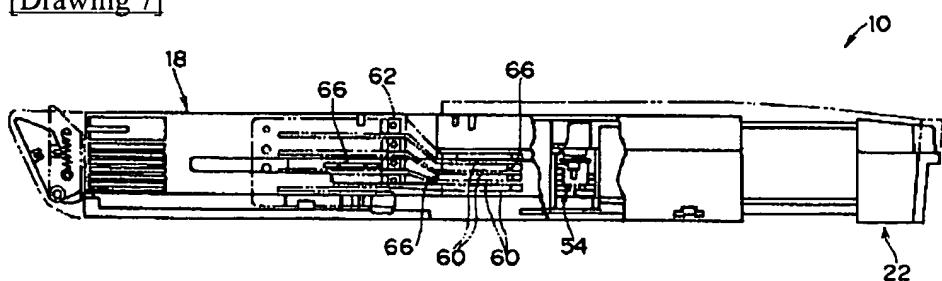
[Drawing 6]



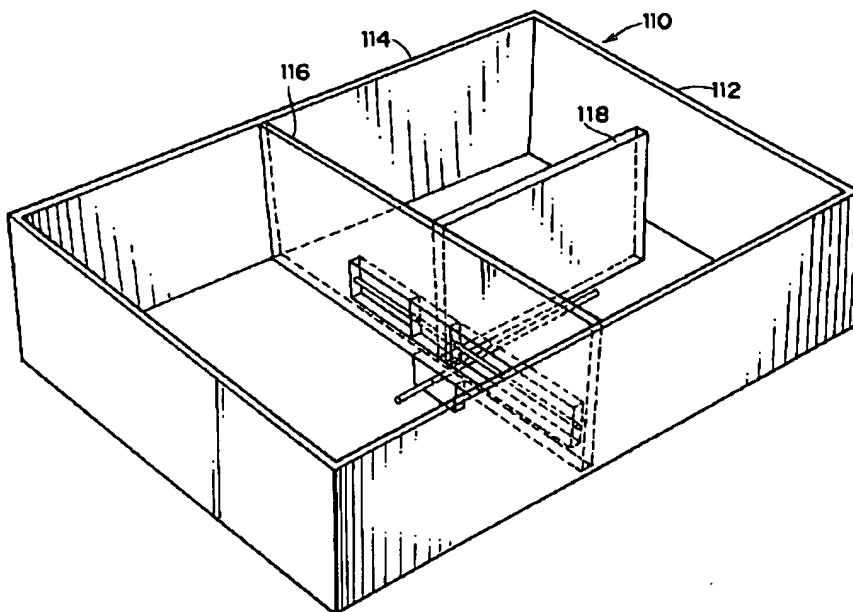
[Drawing 10]



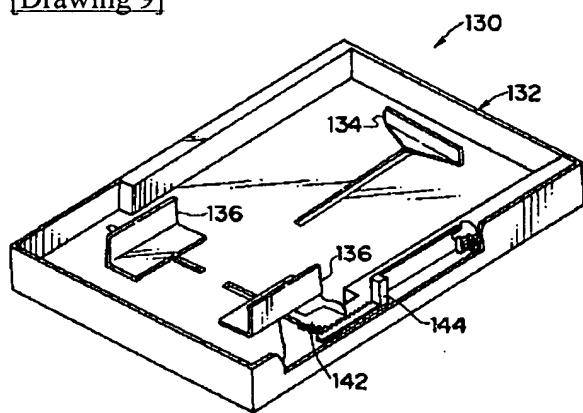
[Drawing 7]



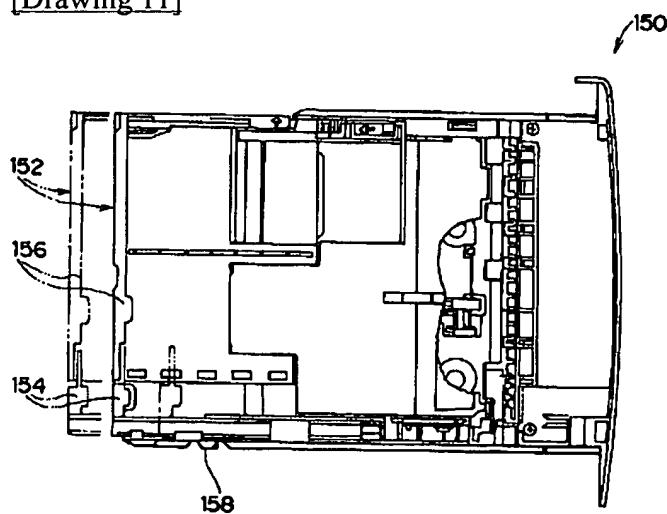
[Drawing 8]



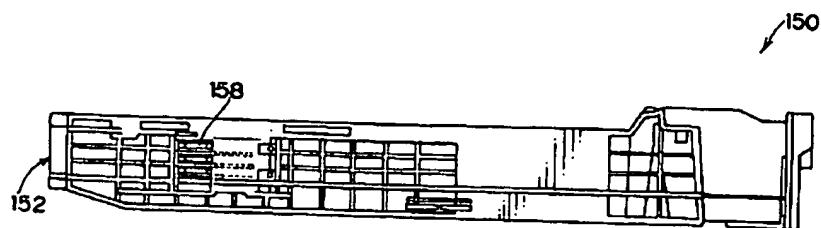
[Drawing 9]



[Drawing 11]



[Drawing 12]



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